Sub A1

CLAIMS

What is claimed is:

1. A traffic light violation prediction system for a traffic signal having a current light phase comprising one of the set consisting of at least red and green, comprising:

at least one violation prediction image capturing device, said violation prediction image capturing device providing image data showing at least one vehicle approaching said traffic signal; and

a violation prediction unit, responsive to said violation prediction image capturing device and indication of said current traffic light phase, wherein said violation prediction unit generates a violation probability score for said at least one vehicle approaching said traffic signal, said violation probability score reflecting a likelihood that said at least one vehicle will violate a red light phase of said traffic signal.

2. The system of claim 1, wherein said violation prediction image capturing device comprises at least one video camera.

3. The system of claim 1, wherein said violation prediction image capturing device comprises at least one digital camera.

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4. The system of claim 1, wherein said violation probability score further reflects a likelihood that said at least one vehicle has violated a red light phase of said traffic signal.

5. The system of claim 1, further comprising:

a violation recording unit, responsive to said violation probability score, for allocating violation recording resources to record a plurality of violation images of at least a selected one of said at least one vehicle approaching said traffic signal, said selected vehicle having a violation probability score at least as high as any other of said at least one vehicle approaching said traffic light.

6. The system of claim 5, wherein said violation recording resources include at least one violation image capturing device.

7. The system of claim 5, wherein said violation recording resources include at least one violation image capturing device.

8. The system of claim 1, wherein said violation prediction unit is software executing on a processor.

9. The system of claim 1, wherein said violation prediction unit is further responsive to a time remaining in yellow light phase input.

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9 ~~10~~. The system of claim 1, wherein said violation prediction unit records a violation prediction value regarding said at least one vehicle approaching said traffic signal.

10 ~~11~~. The system of claim 9 ~~10~~, wherein said violation prediction value indicates a predicted violation in a first state, and indicates no predicted violation in a second state.

11 ~~12~~. The system of claim 1, wherein said prediction unit is further responsive to a current speed of said at least one vehicle approaching said traffic intersection.

12 ~~13~~. The system of claim 1, wherein said prediction unit is further responsive to a current acceleration of said at least one vehicle approaching said traffic intersection.

13 ~~14~~. The system of claim 1, wherein said prediction unit is further responsive to a current position of said at least one vehicle approaching said traffic intersection.

14 ~~15~~. The system of claim 1, wherein said prediction unit is further operable to compute a time remaining before said at least one vehicle approaching said traffic intersection enters said traffic intersection, responsive to determination of a current acceleration of said vehicle.

15 ~~16~~. The system of claim 14 ~~15~~, wherein said prediction unit is further operable to calculate a rate of deceleration required for said at least one vehicle to stop within said

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time remaining before said vehicle enters said traffic intersection.

17. The system of claim 16. wherein said prediction unit further determines whether said required deceleration is larger than a specified deceleration value limit, and if so, updates a violation prediction value for the current frame to indicate that a violation is predicted based on the information contained in the current frame.

18. A method for predicting and recording a traffic light violation of a traffic signal having a current light phase comprising one of the set consisting of at least red and green, comprising:

providing image data showing at least one vehicle approaching said traffic signal; and

generating, responsive to said violation prediction image capturing device and indication of said current traffic light phase, a violation probability score for said at least one vehicle approaching said traffic signal, said violation probability score reflecting a likelihood that said at least one vehicle will violate a red light phase of said traffic signal.

19. The method of claim 18, wherein said violation prediction image capturing device comprises at least one digital camera.

20. The method of claim 18, wherein said violation probability score further reflects a likelihood that said

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at least one vehicle has violated a red light phase of said traffic signal.

20 ~~21.~~ 17 The method of claim ~~18~~, wherein said violation prediction image capturing device comprises at least one video camera.

Sub A3 22. The method of claim 18, further comprising:

allocating violation recording resources responsive to said violation probability score; and

recording a plurality of violation images of said at least one vehicle approaching said traffic signal, said vehicle having a violation probability score at least as high as a threshold score. any other of said at least one vehicle approaching said traffic light.

23. The method of claim 18, further comprising:

allocating violation recording resources responsive to said violation probability score; and

recording a plurality of violation images of said at least one vehicle approaching said traffic signal, said vehicle having a violation probability score at least as high any other of said at least one vehicle approaching said traffic light.

23 ~~24.~~ 22 The method of claim ~~23~~, wherein said violation recording resources include at least one violation image capturing device.

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25. The method of claim 23, wherein said violation recording resources include at least one violation image capturing device.

24 26. The method of claim 17, wherein said generating is performed by a violation prediction unit comprising software executing on a processor.

25 27. The method of claim 17, wherein said generating said violation probability score is further responsive to a time remaining in yellow light phase input.

26 28. The method of claim 17, further comprising recording a violation prediction regarding said at least one vehicle approaching said traffic signal.

27 29. The method of claim 26, wherein said violation prediction indicates a predicted violation in a first state, and indicates no predicted violation in a second state.

28 30. The method of claim 17, further comprising determining a current speed by said violation prediction unit for at least one vehicle approaching said traffic intersection.

29 31. The method of claim 17, further comprising determining a current acceleration for said vehicle approaching said traffic intersection.

30 32. The method of claim 17, further comprising computing a time remaining before said vehicle approaching said

traffic intersection enters said traffic intersection, responsive to determination of a current acceleration of said vehicle.

31 30
~~33~~. The method of claim ~~32~~, further comprising calculating, by said violation prediction unit, a deceleration required for said vehicle to stop within said time remaining before said vehicle enters said traffic intersection.

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32 ~~34~~. The method of claim ~~33~~, further comprising:

determining, by said violation prediction unit, whether said required deceleration is larger than a specified deceleration value limit; and

updating, in the event that said deceleration is larger than said specified deceleration value limit, a violation prediction value for the current frame to indicate that a violation is predicted.

ADD A4

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